APPROVED AT 1/24/18 MEETING

NUCLEAR DECOMMISSIONING CITIZENS ADVISORY PANEL ("NDCAP")
Wednesday, November 15, 2017
Plymouth Community Intermediate School ("PCIS"), Little Theatre, 117 Long Pond Road, Plymouth, MA
Meeting Minutes

Meeting called to order at 6:30 p.m. by NDCAP Co-Chair Sean Mullin.

NDCAP MEMBERS PRESENT:

- John Chapman[1], Executive Office of Housing and Economic Development
- Pat Ciaramella, Representative of Old Colony Planning Council
- H. Joseph Coughlin, Member from Plymouth Nuclear Matters Committee
- Pine duBois, Speaker of the House Appointee
- John G. Flores, Appointee of Governor Baker
- Richard Grassie, Minority Leader of the House Appointee
- Robert Hayden[2], Department of Public Utilities
- Robert Jones[3], Executive Office of Health and Human Services
- Heather Lightner, Representative of the Town of Plymouth
- Joseph Lynch, Representative of Pilgrim Nuclear Power Station[4]
- Elysse Magnotto[5], President of the Senate Appointee
- John T. Mahoney, Representative of the Town of Plymouth
- Sean Mullin, Minority Leader of the Senate Appointee (Co-Chair)
- David C. Nichols, Governor Baker Appointee
- John Ohrenberger, Representative of Pilgrim Nuclear Power Station
- Kevin O'Reilly, Speaker of the House Appointee
- Paul D. Smith[6], Representative of UWUA Local 369

NDCAP MEMBERS NOT PRESENT:

- Jessica Casey, President of the Senate Appointee
- David Johnston[7], Department of Environmental Protection
- Jack Priest, Department of Public Health, Radiological Control Program
- Kurt Schwartz, Massachusetts Emergency Management Agency (Co-Chair)

REVIEW AND APPROVAL OF OCTOBER 18, 2017 MEETING MINUTES:

Co-Chair Mullin called for a motion to adopt the October 18, 2017 meeting minutes as submitted. It was moved and seconded to adopt the October 18th meeting minutes as submitted without correction. The motion passed by a unanimous vote of the panel members present.

[1] Designee of Secretary Ash (Executive Office of Housing and Economic Development).
[2] Designee of Angela O'Connor (DPU)
[3] Designee of Secretary Sudders (Executive Office of Health and Human Services).
[4] Designee of Michael Twomey, Representative of Pilgrim Nuclear Power Station
[5] Designee of Senator Dan Wolf, (President of the Senate Appointee)
[6] Designee of Richard Sherman (Representative of UWUA Local 369).
[7] Designee of Secretary Beaton (EEA).

ADMINISTRATIVE/WORKING GROUP UPDATE:

Co-Chair Mullin reminded the panel that there is no NDCAP meeting scheduled for December. Co-Chair Mullin discussed the possibility of panel members participating remotely when they are unable to attend a panel meeting in person. He stated that if it is an unreasonable burden for a panel member to attend in person, arrangements can be made for remote access both for the main NDCAP and for the working groups. Co-Chair Mullin provided guidelines on this topic from the Attorney General's Office, and proposed that the topic be discussed at the next panel meeting.

Co-Chair Mullin reiterated that working groups must publish notice of their meetings, preferably two weeks prior to each meeting, but at a minimum one week prior to a meeting. He stated that the working groups must also prepare meeting minutes. Co-Chair Mullin stated that the working groups should coordinate with the Plymouth Public Schools regarding room reservations, and that Co-Chair Mullin would prepare the necessary paperwork. Co-Chair Mullin also stated that the working groups can hold meetings in other locations. He also distributed an updated working group membership list.

Co-Chair Mullin noted the openness of the dialogue between Entergy and the panel, and stated his appreciation for that. He then introduced Mr. Lynch.

ENTERGY PRESENTATION:

Mr. Lynch explained that Pilgrim's spent fuel pool has a licensed capacity of 3,859 fuel assemblies and that there are currently 2,990 spent fuel assemblies in the spent fuel pool, and about 580 assemblies in the reactor, which is currently in its final operating cycle. Those 580 assemblies will eventually be stored in the spent fuel pool. Mr. Lynch stated that there are currently 544 spent fuel assemblies stored in eight dry storage casks in the first independent spent fuel storage installation ("ISFSI") pad. Mr. Lynch explained that since Pilgrim became operational in 1972 and its expected closure date, a total of 4,114 fuel assemblies would have been generated.

Mr. Lynch stated that Pilgrim currently has one ISFSI pad with a 40-cask limit, but that Entergy has chosen administratively to limit it to 38 casks to facilitate movement of the casks. The ISFSI pad currently has eight loaded casks made by Holtec. Mr. Lynch stated that Entergy plans to continue loading casks in 2018 and 2019. Mr. Lynch explained that a second ISFSI pad will be needed to store all the spent fuel on site. The second ISFSI pad will involve design, engineering, and vendor selection to determine the size of the pad and type of casks.

Mr. Lynch next showed a map of the site showing where the first ISFSI pad is located, and also an aerial photo of the site. Mr. Lynch stated that the pad is 300 feet from the intake canal, which is the nearest water resource. He explained that siting the second pad will be an important part of the decommissioning process and that it will be part of the post-shutdown decommissioning report ("PSDAR"). He stated that the PSDAR will focus on three subjects: (1) a very detailed cost estimate; (2) the overall plan and schedule for decommissioning; and (3) and a plan of what to do with spent fuel. Entergy will have to explain in the PSDAR what will happen with spent fuel. He stated that the NRC has held that fuel can be stored safely both in wet and dry storage. Mr. Lynch stated that Entergy has developed a list of considerations based on its experience siting the first ISFSI pad. These include regulatory requirements, local permitting, geotechnical considerations, security requirements, radiological considerations, and impacts on decommissioning.

Mr. Lynch explained that the second ISFSI pad will accommodate all the spent fuel in the spent fuel pool and that presently in the reactor. The second pad will also include additional storage for greater than

class C waste until it can be shipped to a repository that can accept greater than class C waste. Mr. Lynch stated that the pad will be concrete and similar in design to the existing pad, will consider the effects of storm water runoff and drainage, will accommodate the vertical cask transporter operation, and will be compatible with the Holtec HI-STORM cask system.

Mr. Lynch explained that the pad planning process would account for interferences and sub-surface utilities, including security systems, piping, leach fields and electrical systems. Entergy will also consider the relocation of certain underground utilities, and will work around other underground items that cannot be moved. Mr. Lynch stated that the planning process would account for all these issues.

Mr. Lynch explained that the regulatory requirements at 10 CFR § 72 subpart E describes the site evaluation factors to be considered for the storage of fuel. Among the factors to be considered are flooding, fires, seismic considerations, and offsite fuel transport. He explained that 10 CFR § 72(F) provides general design criteria. Mr. Lynch stated that the factors to be considered are security, radiation protection, and fencing systems. Mr. Lynch stated that 10 CFR § 73(H) describes security requirements including a physical protection plan. Mr. Lynch also described local permitting requirements, including the zoning board of appeals, conservation commission, and construction permits.

Mr. Lynch described geotechnical consideration for the site of the new pad, including geological, subsurface, and seismological requirements. Mr. Lynch also explained that the site will have to meet certain NRC requirements and that a cask must be designed to satisfy seismic loading and soil liquefaction considerations.

Mr. Lynch stated that the site must meet the cask designer's specifications, industry standards, and loading combinations. Mr. Lynch also explained that the pad's electric design must satisfy grounding, lighting, temperature monitoring, and emergency backup power requirements. He further explained that the NRC has regulations governing site security in 10 CFR §§ 72 and 73. The regulations state that a pad must be located in a security owner-controlled area. Mr. Lynch stated that the site design will also incorporate radiological considerations, including site boundary dose and radiation protection techniques.

Mr. Lynch stated that site control includes hazard considerations, including protection from fires and explosions. He explained that natural events must also be prepared for, including hurricanes, tornados, flooding, and tornado missile events. Regarding flooding, Mr. Lynch explained that the first ISFSI is at 25 feet above mean sea level and 300 feet from the nearest shoreline. He stated that each loaded cask weighs 173 tons and is 18 feet x 11 feet. He explained that a flood evaluation was conducted in 2010, and a reevaluation was conducted in 2015 in response to the Fukushima flood, that this evaluation is applicable to the siting of the new pad, and that flooding is not implicated for the first pad. Mr. Lynch then showed a map demonstrating the results of the flood evaluations. He also explained the flooding scenarios that were studied, and explained that they would not reach the height of the ISFSI pad. He stated that the study was submitted to, and accepted by the NRC.

Mr. Lynch concluded his presentation by explaining the importance of the second pad siting process. He stated that there are a number of regulatory and technical requirements that will inform the process, that more information will be made available to the panel as the process moves forward, and that comments could be submitted to Entergy through the co-chairs. Co-Chair Mullin then opened up the floor to questions from members of the panel.

PANELIST QUESTION AND ANSWER:

Mr. Ciaramella asked whether the dry storage casks are susceptible to damage that would require extensive repairs. Mr. Lynch responded by explaining that the casks are relatively simple devices that are designed not to corrode, and that they have a licensed life of 20 years, after which a manufacturer would have to request an extension from the NRC. Mr. Lynch stated that a representative from a cask manufacturer would be a useful guest speaker at an upcoming NDCAP meeting. He stated that the cask design includes steel on both the outside and inside and that rebar therefore is less likely to corrode.

Mr. Coughlin asked about liquefaction of soil, and particularly whether there is any fill at the potential sites of the new pads, and whether there was any fill at the site of the first pad. Mr. Lynch responded that testing would be done to analyze the soil to ensure that it is suitable for construction.

Ms. duBois requested clarification on the existing pad's elevations. Mr. Lynch explained that the pad's lowest elevation is 25 feet, and on the other end it is 25.5 feet. Ms. duBois asked about the leaching field, and requested clarification of its locations. Mr. Lynch explained that there are multiple leaching fields, and that they present engineering constraints. Ms. duBois asked about the Areva flood evaluation report, and noted that the report does not adequately account for sea level rise. She also explained that the report is too reliant on studying hurricane effects, and did not study the effects of nor'easters.

Mr. Hayden asked whether Entergy has an estimated completion date for the second pad, and whether the company has developed a cost estimate for it. Mr. Lynch replied that Entergy is still in the early stages of gathering information, and that vendor selection will not be complete for another year. Regarding costs, Mr. Lynch explained that it is too soon to provide an estimate.

Mr. Grassie asked who develops the specifications for a cask. Mr. Lynch replied that the casks are designed by Holtec and approved by the NRC. Mr. Lynch stated that testing requirements are borne by the manufacturer and shown to the NRC. Mr. Lynch stated that Holtec's technology has been in use since 1986. Mr. Grassie asked whether there are other approved manufacturers other than Holtec, and Mr. Lynch replied that there are.

Mr. Flores asked whether Entergy's storm surge studies took into account the possibility of an extreme storm event, such as a category five hurricane and an astronomically high tide. Mr. Lynch replied that he was not certain, but that the report was produced in 2015 and revised previous evaluations. Mr. Lynch recommended that the panel ask a cask manufacturer about the effects of water on the cask in the event that they do become flooded. Mr. Flores followed up by asking about workforce safety during the decommissioning process. Mr. Lynch explained that NRC regulations require them to follow safety standards, and that even if Entergy hires outside experts, they would be subject to the same safety standards.

Mr. Jones asked about cask transportation, and whether the casks would eventually be transported with the spent fuel rods inside. Mr. Lynch explained that the inner canister of the casks is not opened, but that it is removed from the outer cask and placed into a transportation cask.

Ms. Lightner asked whether Entergy has narrowed down potential sites for the second pad. Mr. Lynch explained that Entergy is still in the information gathering stage, and that the engineering firms that bid on the project will provide possible pad locations. Ms. Lighter followed up by asking whether Entergy

would site the pad near the first pad, because that pad's location was selected for its convenience for transporting casks. Mr. Lynch stated that it is too early to say, but that substructure interference is a major consideration in siting the second pad. Mr. Lynch stated that he would provide updates as the site selection process moves forward.

Mr. Mahoney asked whether the second pad will be able to store all waste both currently in the spent fuel pool and that which will be produced until Pilgrim ceases operating. Mr. Lynch confirmed that it would. Mr. Mahoney followed up by asking about timing, and at what point in the process would request local permitting. Mr. Lynch explained that this would occur at some point after a design has been selected. Mr. Mahoney asked whether the first pad's costs were roughly $150 million, as had been an estimate. Mr. Lynch stated that he could not answer the question with certainty. Mr. Lynch stated that the first pad was paid for out of Pilgrim's operating budget, although Mr. Lynch stated that the company can sue the Department of Energy for costs associated with on-site storage.

Mr. Nichols requested further clarification regarding what would happen if the casks were flooded. Mr. Lynch stated that the casks can be submerged and dry themselves out with vents. However, he stated that the panel should seek confirmation from the manufacturer itself. Mr. Nichols followed up by asking why Entergy uses mean sea level instead of mean high water to measure flood effects. Mr. Lynch explained that mean sea level is a reference point, and that using a different reference point would not change the analysis.

Mr. O'Reilly asked about height of the highest historical storm surges at Pilgrim. Mr. Lynch stated that the highest storm surges were either 16 or 18 feet above mean sea level, or nine or ten feet below the pad. He stated that he could not recall an incident of water coming close to the building. Mr. O'Reilly asked whether there is a requirement that the casks be outside. Mr. Lynch stated that the pad design varies depending on what is best at each site, and that based on the conditions present at Pilgrim, the first pad was sited appropriately.

Mr. Smith asked whether there are similarities or differences to the Yankee Rowe decommissioning. Mr. Lynch stated that Yankee Rowe also has a natural circulation configuration that is similar in type to what is envisioned at Pilgrim. He stated that it underwent the same siting criteria as Pilgrim.

Co-Chair Mullin requested a copy of Mr. Lynch's presentation and stated that he would load it to the NDCAP website. He next requested that the panel be allowed to participate in the ongoing siting process by providing input, which Mr. Mullin stated would be acceptable. Co-Chair Mullin requested that Entergy provide the selection criteria used in siting the first pad. Mr. Lynch stated that he would provide information that is publicly available. Regarding the maps showing mean high tide, Co-Chair Mullin requested confirmation that Entergy used a margin of 2.6 feet under the worst case scenario. Mr. Lynch confirmed that this was correct. Co-Chair Mullin asked whether a new site assessment would be conducted to determine a new high tide resulting from sea level rise. Mr. Lynch stated that Entergy would use the most up to date information to inform elevations. Co-Chair Mullin noted that canisters are licensed for 20 years, and asked what would happen past the 20 year license term. Mr. Lynch stated that Holtec would be prepared to extend the licenses well into the future, and that this question should be asked directly to them. Co-Chair Mullin requested confirmation regarding height of the corner of the existing pad, specifically whether it is 110 feet or 300 feet. Mr. Lynch stated that he could not answer that without additional information.

PUBLIC QUESTION AND ANSWER:

Co-Chair Mullin announced that Mr. Lynch and the Panel would next receive questions from members of the public.

Mr. Richard Rothstein asked whether the NRC has approved the flood reevaluation report submitted to the NRC by Entergy in March 2016. Mr. Lynch stated that the NRC has accepted the flood reevaluation report and Entergy's response to that part of the Fukushima task force.

Ms. Henrietta Consentino stated that she is concerned about the proximity of the pad to the shore, and that the rising sea level exacerbates this concern. She also remarked that she is concerned about the possibility of casks developing cracks after 30 years.

Mr. Jim Lampert asked whether Entergy plans to move all the greater than class C waste at the site into casks in the pads. Mr. Lynch responded that he could not say, because disposal of the reactor is a project that will likely be outsourced, and the technology for this particular task is constantly evolving. He stated that they are planning to include some storage space for greater than class C waste. Mr. Lampert asked whether the greater than class C waste currently on site but not stored in the existing pad would eventually be stored in the new pad. Mr. Lynch stated that he could not answer without additional information. Mr. Lampert asked how many of the 4,114 fuel assemblies that will ultimately be stored in casks are high burnup fuel. Mr. Lynch responded that the types of fuel will be taken into consideration, and that he could follow up with the Panel on the total number of high burnup fuel assemblies that will eventually be stored. Mr. Lampert followed up by recommending that Mr. Lynch and the Panel familiarize themselves with a study examining the possibility of an attack on spent fuel casks. Mr. Lampert stated that he is concerned that the planning process is too concerned with the present, and not enough with projections of the future.

Ms. Mary Lampert noted that Vermont Yankee is decommissioning under the assumption that all fuel will be moved offsite by 2052, and that by 2025 an interim storage facility available at which time offsite transportation of waste can begin. She stated that this is unrealistic and that the Panel should consider worst case scenarios, not best case scenarios. She stated that the current Holtec casks are designed for short term use, and that they can crack after 30 years. Ms. Lampert stated that cathodic protection can limit the effects of corrosion. She also noted that the NRC has stated that there is no way to test for cracks, and cracks will not be known until radiation is detected.

Ms. Rebecca Chin recommended that the monitoring wells that are onsite now should continue operating into the future. She noted that during the construction of the first pad, one well was paved over and has not been replaced. She stated that the runoff from the pad needs to be monitored by monitoring wells to ensure that groundwater is not contaminated. Co-Chair Mullin requested that Ms. Chin follow up on this subject to the Panel via email.

WRAP UP AND ADJOURN:

Co-Chair Mullin thanked Mr. Lynch for his presentation. Co-Chair Mullin provided a scheduling update, suggesting that the January NDCAP meeting involve a discussion of radiation issues. He mentioned that he would like to invite Dr. Bill Irwin from Vermont as a guest speaker. He stated that the Panel should begin to transition from information gathering to a more proactive role. For February, Co-Chair Mullin stated that he would like to hold a meeting in Cape Cod and focus on state and national legislative initiatives. For March, Co-Chair Mullin suggested holding a meeting in Boston or at MIT. This would provide an opportunity for industry experts and elected officials to provide input. For April, Co-Chair

Mullin suggested discussing the work of the working groups, and discussing which topics have prevailed at the working group meetings to develop a framework for developing written recommendations. Co-Chair Mullin suggested that drafts be prepared in advance of the May meeting and that those recommendations would be reviewed at that meeting. For June, Co-Chair Mullin suggested discussing the first annual report and soliciting feedback from the public on the Panel's progress during the first year. During the second half of the year, Co-Chair Mullin suggested hosting speakers from Holtec and other dry cask storage manufacturers. Mr. Coughlin requested that Co-Chair Mullin make revisions to the previous schedule reflecting these changes.

Mr. Lee Cook stated that he has concerns about the long-term integrity of the Holtec dry storage casks, and that he believes that the casks warrant the Panel's attention at a time sooner than that proposed by the Co-Chair.

Co-Chair Schwartz adjourned the meeting.

Meeting adjourned at approximately 8:10 p.m.

DOCUMENTS USED AT MEETING:

- Entergy presentation on the second ISFSI pad siting process